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ABSTRACT

This study compared teachers instructed in use of Landsat satellite maps through one-way television and simultaneous telephone group conferencing to another teacher group instructed directly. Thirty teachers of intermediate children in Edmonton and Sherwood Park, Alberta, received 5 hours of instruction about Landsat maps over a 2-week period; they began instructing their pupils in Landsat map use during the second week. The Edmonton teachers received direct instruction in one center while Sherwood Park teachers received TV-telephone instruction in three different centers. Both groups had the same instructors and materials. Pupils taught by these teachers were tested on their ability to interpret Landsat maps, and teachers rated their inservice training with a mail questionnaire. Results indicated that the TV-telephone mode was acceptable as an inservice delivery system, and was rated desirable by a majority. A substantial minority, however, viewed the experimental mode as undesirable, indicating a need for future analysis and some improvement on the present delivery mode. The TV-telephone mode was superior on physical comfort and convenience ratings, but no significant intergroup differences were found in capability to impart instruction. This report includes two references and suggests topics for further research. (LMM)

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A Report To The Innovative Projects Fund
Alberta Department of Advanced Education
And Manpower, Program Services Division
May 30, 1980

"Distance Education: One Way Television With Simultaneous Telephone Group Conferencing Using Satellite Maps As A Monitoring Device"

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Distance Education: One Way Television Instruction With Simultaneous Telephone Group Conferencing Using Satellite Maps As A Monitoring Device*

In this project, a group of teachers instructed about Landsat satellite maps by one way t.v. and simultaneous telephone group conferencing were compared to another group instructed face to face. The pupils taught by both groups were then examined to determine their ability to interpret Landsat maps. Results indicate that the t.v. group telephone procedure is a viable mode of instruction.

In a previous project, the authors determined that group telephone conferencing was a usable instruction procedure (Kirman and Goldberg, 1979). However, it was noted that much dissatisfaction was expressed by those using that procedure. The impersonalness of group telephone conferencing was especially noted. In order to eliminate this element, the authors hypothesized that the addition of one way television in which the participants could see their instructor would be of some value. In addition, if the participants could be with a small group, rather than being alone, the impersonalness of the situation could further be diminished.

Another feature of the previous project that caused dissatisfaction was the discomfort of having to hold a telephone to one's ear for a prolonged period of time. To overcome this, and to possibly enhance the group atmosphere, "speaker" telephones were used, enabling participants to hear and speak with the instructor without having to hold a telephone receiver.

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The implications of pursuing this new mode of instruction are: the convenience of offering distance education courses to students without the need to "export" an instructor; to provide a delivery system that could reach students in distant areas that ordinarily might not merit staffing; to teach students scattered over an area too vast to provide a central location for face to face instruction; to provide expert guidance to teachers and other professionals not within commuting distances of universities and other centers; and to increase the numbers of people served by education facilities in a period of declining enrollments.

The procedures utilized in this project can be used over both land lines using cable or microwave television and long distance telephones, or with communications satellites such as the Anik B that have t.v.-telephone capacities.

A review of the literature failed to produce any information of other projects using one way television with simultaneous group telephone conferencing.

Procedure

The Landsat satellite images were used for instruction since they are a new classroom tool and teachers and pupils have little or no familiarity with them at this time. Thus, the teachers would be more dependent upon the instructor for information about these images. Previous research has shown that children as young as those on grade three level are capable of using infrared false color Landsat satellite images (Kirman, 1977).

Thirty teachers of grades 4, 5, and 6 children in both Edmonton and Sherwood Park, Alberta volunteered for this project and were divided into two groups, fifteen in Edmonton, and fifteen in Sherwood Park. The fifteen Sherwood Park Ss (t.v.-telephone group) were the teachers of 86 grade four, 157 grade five, and 122 grade six pupils. The Edmonton Ss (face to face group) were the teachers of 69 grade four, 121 grade five, and 163 grade six pupils. Both groups of teachers received five hours instruction about Landsat satellite maps over a two week period. During the first week they received two 2 hour sessions on different days, and during the second week, a 1 hour session with a representative of the Alberta Remote Sensing Center participating to answer technical questions. During the second week they also began to teach their pupils about Landsat satellite maps for approximately three weeks. The pupils did not receive television-telephone instruction.

The Edmonton teachers received their Landsat map instruction face to face in one center. The Sherwood Park teachers received their instruction via one way cable color television and group telephone conferencing in three different centers. Speaker telephones were installed in each Sherwood Park center. Both groups had the same instructor and materials. Materials consisted of an instructional manual with class sets of infrared false color Landsat images, magnifying glasses, protective acetate covers for the images, china markers to write on the acetates, and rulers.

In order to eliminate talking into a void, one teacher in each of the three Sherwood Park Centers was designated as a group leader. The group leader would be asked by the instructor if there were any questions, or would be directed to query others in that center about areas of concern. The group leader was also responsible for checking the equipment and area prior to the sessions.

The instructor also made use of a prerecorded tape during one session. This allowed her to move in a step by step instruction procedure, stop the tape with the image on hold, and ask questions about it. She could also stop the tape, go on camera and discuss some of the items on the tape with the teachers and then return to it. The teachers also had the opportunity to cross-question or clarify points with the others.

Prior to beginning their classroom Landsat instruction, teachers were required to survey their pupils for any knowledge of Landsat imagery. No pupil was reported to have had any ability to interpret these images. When the teachers concluded their pupil Landsat instruction, the inservice instructor personally administered an objective achievement test to the children. At that time the teachers received a questionnaire designed to enable them to rate their inservice training. It was filled out at their convenience and mailed in. The pupil Landsat achievement test results and teacher responses to the rating questionnaire were the indices used to assess the effectiveness of the t.v.-telephone mode of delivery.

Teacher Data

TABLE 1

COMPARATIVE DATA ON T.V.-TELEPHONE INSTRUCTED AND CONTROL GROUP (N = 30)

	$\bar{X}$ Age	$\bar{X}$ Years of Teaching Experience	$\bar{X}$ Years Teaching Present Grade	$\bar{X}$ Estimate of Time Studying Landsat (Minutes)	$\bar{X}$ Estimate of Time Teaching Landsat (Minutes)
T.V.-Telephone Group	31.5	7.9	2.6	222.9	327.5
S.D.	(7.86)	(7.6)	(1.6)	(174)	(238)
Face to Face Group	39.8	15.6	6.7	388	304.2
S.D.	(7.03)	(7.1)	(4.4)	(188)	(118)
T	3.03	2.9	3.3	1.7	.32
P (two tailed)	<.005	<.007	<.002	<.09	<.74

Table 1 shows that the control group teachers were significantly older (39.8 vs. 31.5 yrs.) had significantly more years of teaching experience (15.6 vs. 7.9 yrs.) and had significantly more years teaching experience in their present grade (6.7 vs. 2.6) than the t.v.-telephone instructed teachers. The table also shows no significant differences between the two groups in the amount of time spent studying Landsat imagery or the amount of time spent teaching Landsat imagery to pupils.

Although the two groups of teachers differ in teaching experience, one would not expect this difference to affect the results of the study because of the considerable amount of experience ($\bar{X}$ of 7.9 yrs.) of even the less experienced t.v.-telephone group. If the difference in teaching experience had an effect it would presumably have confered an advantage on the control group, making this a more severe test of the effectiveness of the t.v.-telephone mode of delivery.

Teacher Evaluation of In-Service Delivery System

Anonymous evaluations of the delivery systems were obtained from all thirty teachers after they had completed both their inservice and their teaching of Landsat maps to their pupils. An evaluation form similar to that used in Kirman and Goldberg (1979) was employed in order to permit comparison of evaluative data from the two studies.

Most important for the potential use of the delivery systems is the teacher response to the following: "If you were involved in further training in Landsat would you find your present system: 1. Acceptable - Yes, No 2. Desirable - Yes, No". The results show that 11 out of 15 of the t.v.-telephone group responded yes to 1 as compared to 15 out of 15 of the control group - the difference being non-significant (chi-square = 2.59; $P < .10$).

To item 2 on desirability, 15 out of 15 of the control group responded yes once again, as compared to only 8 out of 15 of the t.v.-telephone group - the difference being significant (chi-square = 6.71, $P < .01$).

The above data suggest that while the t.v.-telephone mode is acceptable as a means for inservice delivery and is rated as being desirable by a majority, it is viewed as being an undesirable mode by a substantial minority of teachers.

Comparison of the present data with comparable data from Kirman and Goldberg (1979) where only 22% of Ss found the telephone mode of delivery acceptable as compared to a 73% acceptability rating here, suggest that the addition of t.v. and speaker telephones had improved the delivery mode as predicted. The lower than hoped for rating on desirability indicates that further analysis and, possibly, some improvement on the present delivery mode is necessary.

Other data from the evaluation questionnaire show that the t.v.-telephone mode received significantly better ratings on physical comfort and convenience than the face to face mode. The two modes were found not to differ significantly on the capability to impart basic instruction and new ideas about Landsat teaching. The face to face mode was rated significantly better on the following dimensions: creating the opportunity to raise questions, making it possible to obtain feedback, permitting interaction with other students and instructor, and permitting learning from other students. These results suggest that while the t.v.-telephone mode as used here was adequate for instruction purposes, it is less adequate than the face to face mode for enabling the interactive aspects of instruction to take place. Perhaps the satisfactory rating on acceptability reflects the first aspect, the lower ratings on desirability reflect the second.

The last questionnaire item asked the following: Given a choice between the two modes of instruction which would you choose? All fifteen of the face to face group indicated they would choose face to face instruction. Of thirteen of the t.v.-telephone group who responded to this question, five, or 39%, indicated they would choose t.v.-telephone instruction.

In comparison to Kirman and Goldberg's previous research (1979) only 11% of Ss (telephone alone) indicated that they would prefer it to face to face instruction. This is an indication that the changes introduced in the distance mode appear to have had a positive influence.

Children's Achievement Test

The children's achievement test consisted of thirteen multiple choice questions and an infrared false color image divided into grids. The children were required to answer questions about the image in particular, e.g., find a city, find a river, etc., and Landsat satellite images in general, e.g., How was this image made? etc. The achievement results of the grades 4, 5, 6, pupils were combined since statistical analysis of the between grade differences were found tc be non-significant.

TABLE 2

COMPARISON OF PUPILS' ACHIEVEMENT ON THE 13 ITEM LANDSAT ACHIEVEMENT TEST (N = 718 PUPILS)

	T.V. - Telephone Ss's Pupils (N = 365)	Face to Face Ss's Pupils (N = 353)
$\bar{X}$	9.89	9.58
S.D.	2.04	2.13

$t = 2.01$, d.f. = 716
$P < .04$ (two tailed test)

Table 2 shows that, although the scores were quite close, the pupils taught by teachers introduced to Landsat maps via the t.v.-telephone mode of delivery scored significantly better on the map achievement test than those pupils taught by the control group of teachers ($\bar{X}$ = 9.89 vs. 9.58, $P < .04$). The pupils of the control teachers are considered to have performed well in view of their being correct on 74% of the test questions on the average. The inservice of the control teachers was clearly sufficient for the purpose of transmitting new knowledge and skills to them.

The significantly better performance of pupils of the t.v.-telephone group (Average = 76%) cannot be attributed to the delivery mode because of the uncontrolled variables in this study. The least that can be concluded is that the t.v.-telephone mode of delivery is sufficient for imparting new knowledge and skills. It is interesting to also note the near significant Landsat achievement difference favoring a telephone group over a face to face instructed group of student teachers previously reported on by Kirman and Goldberg (1979).

Conclusions

From the above data, it appears that a t.v.-telephone group mode of delivery for a teacher inservice training course is at least as effective as a face to face mode of delivery for communicating information to be eventually taught to pupils. In addition the scores of the children on their achievement test appear to support Kirman's (1977) previous research indicating that elementary school children are able to work with Landsat infrared false color imagery.

Some of the teachers in the t.v.-telephone group expressed a preference for face to face instruction. This may have been due to feelings of resistance to technology and the lack of familiarity with this mode of

instruction. Such preferences might become more positive with greater use of the method. However, it appears that if no other means of instruction were available, the data indicate that the t.v.-telephone group procedure would probably be acceptable.

In a previous project involving only telephones, Kirman and Goldberg (1979) found that impersonalness of the procedure was a concern to many of the participants. In this project it appears not to have been a major factor. This may be due to both the television use and the placement of students in groups to participate. Impersonalness may still be a factor where the student is not in a group. In addition, personal habits and attitudes toward television watching may also play a part in responses to this mode of delivery, as well the personality of the t.v. instructor.

Questions For Further Research

1. Do personal habits and attitudes toward television watching have an influence on student attitudes and performance with this mode of delivery?

2. Does the personality of the instructor have an influence on student attitudes and performance with this mode of delivery?

3. Would a generation of teachers brought up with extensive television viewing respond to this mode of delivery differently than those in this project?

4. Would greater familiarity with this mode of instruction provide a more positive attitude toward it?

5. What type of instruction or materials best lend themselves to this mode of instruction?

6. Would students instructed only by television lecture perform as well as students using t.v.-telephone group instruction?

7. How would students perform using this mode of instruction on an individual basis rather than being in a group?

8. Can this mode of instruction be successfully used with children?

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